POLYMER ENCAPSULATED CERAMIC SUPERCONDUCTORS

Cross-Reference to Related Applications

The application is a continuation-in-part of parent application U.S. Serial No. 09/360,318 filed July 23, 1999 USPAT 6,444,917 entitled "Encapsulated Ceramic Superconductors." The parent application is incorporated herein by reference.

Background of the Invention

The invention relates to composite ceramic superconducting tapes and structures. Tapes including ceramics such as $YBa_2Cu_3O_{7-\delta}$ (YBCO 123), $(Pb,Bi)_2Sr_2Ca_2Cu_3O$ (BSCCO 2223), and $(Pb,Bi)_2Sr_2Ca_1Cu_2O$ (BSCCO 2212) can become superconducting at relatively high temperatures, e.g., liquid nitrogen temperatures, and are ideal for carrying electrical current over large distances. The composite superconducting tape usually includes superconducting portions of ceramic material within a conductive metal matrix (e.g., BSCCO filaments within a noble metal matrix) or superconducting portions coated on a conductor (e.g., one or more layers of YBCO or BSCCO supported on a conducting substrate). A support structure such as a metallic tape can be laminated to the composite superconducting tape to provide it with mechanical strength and resilience. During operation the superconducting article (e.g., superconducting tape and support structure) is immersed in fluid cryogen (e.g., liquid nitrogen, liquid helium, or supercritical helium) for an extended period of time. During this time fluid cryogen may infiltrate into the superconducting ceramic material. For example, the